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MAGNETIC RESULTS ANTARCTIC PENINSULA TRAVERSE

1961-1962

P. J. WASILEWSKI

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MAGNETIC RESULTS
ANTARCTIC PENINSULA TRAVERSE
1961-1962

INTRODUCTION

This report contains tabulations of the results of measurements of the earth's magnetic field made on the Antarctic Peninsula Traverse which was conducted during the 1961-1962 austral summer. The principal operations of this traverse were carried out by the Geophysical and Polar Research Center of the University of Wisconsin under a grant of funds from the National Science Foundation. Although geophysical traverses have been made by the United States in the Antarctic each summer since the beginning of the International Geophysical Year, this is the second season in which geomagnetism was included as a major discipline. The U. S. Coast and Geodetic Survey, also with funds provided by the NSF, supplied a magnetic observer for this traverse and the previous season's Ellsworth Highland and McMurdo-to-Pole Traverses.[1]

PERSONNEL

The participants in the Antarctic Peninsula Traverse were as follows:

Name	Discipline	Organization
Behrendt, John C.*	Seismology & Gravity	University of Wisconsin
Kreiling, Lee C.	Traverse Engineer	University of Wisconsin
Merrick, Conrad G.	Geodetic Control	U. S. Geological Survey
Molholm, John R. T.	Glaciology	Ohio State University
Parks, Perry E. Jr.	Seismology & Gravity	University of Wisconsin
Shimizu, Hiromu	Glaciology	Ohio State University
Wasilewski, Peter J.	Geomagnetism	U. S. Coast & Geodetic Survey

TRAVERSE OBJECTIVES

The primary objectives of the traverse are listed below:

1. Determination of surface elevations.
2. Geodetic control of topographic features.
3. Determination of ice thickness.
4. Determination of seismic velocity in the rock material beneath the ice.

* Traverse leader

5. Study of annual snow accumulation.
6. Study of snow, firn, and ice parameters.
7. Meteorological observations.
8. Gravity measurements.
9. Magnetic field measurements.

This report covers only the results of the measurements of the magnetic vector at the major scientific stations of the traverse. The results of the total intensity measurements of the magnetic field which were made every 0.5 mile along the traverse route[2] as well as other data are the subject of reports by the other participating institutions.[3]

TRAVERSE ROUTE

The traverse departed from Camp Minnesota[4] (73° 29.0' S., 94° 25' W.) on November 30, 1961, and traveled in an easterly direction until reaching station 320 (74° 03.0' S., 80° 32' W.) and then southeasterly to Sky-Hi Station[5] (station 433.5--75° 14.5' S., 77° 07' W.). From Sky-Hi the route was northeasterly to station 700 (73° 32.0' S., 68° 35' W.) and then southerly to station 764 (74° 03.5' S., 66° 35' W.). From station 764 the traverse followed a southwesterly course to station 864 (75° 00.3' S., 68° 50' W.) and then westerly back to Sky-Hi Station where the traverse was terminated.

Due to crevasses, nunataks, and inclement weather the actual direction of travel was altered from time to time. The route of the traverse is shown in figure 1.

INSTRUMENTS

The instruments used in the magnetic program were a Varian M49-A Proton Precession Magnetometer, a Gurley Transit Magnetometer, and a CARL Type 323 Portable Magnetometer designed by Serson and Hannaford,[6] and built by Canadian Applied Research. Mounting the null-field detector of the CARL Magnetometer on the telescope of a non-magnetic transit (the transit magnetometer was modified and used) permitted determining the direction of the magnetic field. The use of 250-foot cables and a remote meter permitted the control panel of this instrument to be kept in a heated vehicle during magnetic observations.

The CARL Magnetometer was used for the measurement of magnetic declination and inclination. Although it was also capable of measuring total magnetic intensity, the more suitable Varian Magnetometer was used instead. The Gurley Transit Magnetometer was used at 3 stations to measure the magnetic declination and horizontal intensity.

The 3 magnetometers were standardized at the Fredericksburg Magnetic Observatory before and after traverse operations. In addition, comparison observations were made against other observatory instruments in the Antarctic. On the basis of these standardizations and comparisons the following instrumental corrections have been applied to all observed values.

Instrument	D	I	F	ΔH/H
CARL 1-001A	0.0'	0.0'	--	------
Varian M-49A 167	---	---	0γ	------
TM 580181	-3.5' to E	---	--	------
TM 580181 C-1	---	---	--	-0.0005
TM 580181 C-2	---	---	--	-0.0007

REOCCUPATION OF PREVIOUS MAGNETIC STATIONS

The first portion of the route of the Antarctic Peninsula Traverse bypassed the approximate location of a few of the magnetic stations established the previous season by H. Meyers during the Ellsworth Highland Traverse. Wherever possible, observations were made in order to obtain some information about the annual change in the area. Listed below are the mean values of observations at these stations.

Traverse	Station	Latitude	Longitude	Date 1961	D	I	F
EHT	1215.0	73° 29.0' S	94° 25' W	Feb. 11-12	42° 08' E	68° 29.4' S	55463
APT	0.0	73° 29.0'	94° 25'	Nov. 26-30	42° 11'	68° 27.8'	55285
EHT	1116.0	73° 59.5'	89° 58'	Feb. 5-6	40° 06'	67° 49.1'	54458
APT	112.0	73° 58.0'	90° 05'	Dec. 4-8	40° 05' E	67° 44.1' S	54301
APT	115.6	73° 59.0' S	89° 58' W	Dec. 8	-----	-------	54340

EXPLANATION OF TABLE OF MAGNETIC OBSERVATIONS

Station. The station number represents the traversed mileage from Camp Minnesota. The major scientific stations were generally at intervals of 32 nautical miles.

Latitude and Longitude. Positions were determined from solar observations with a Wild T-2 Theodolite. The observations and computations were done by Conrad G. Merrick, a U. S. Geological Survey topographic engineer. The lines of position were computed using U. S. Navy Oceanographic Office Publication No. 214 (Tables of Computed Altitude and Azimuth) and plotted on a 1:1,000,000 water chart. Corrections for refraction and parallax were obtained from Coast and Geodetic

Survey Special Publication 237, "Manual of Geodetic Astronomy". The positions are believed to be accurate to within 0.5 mile for most stations.

Magnetic Observations. The results presented are the observed values, with instrumental corrections applied. Corrections for daily variation and transient fluctuations have not been applied. Except if indicated otherwise, the measured components of the magnetic field were declination (D), inclination (I), and total intensity (F). Each of the observed values is listed with the Universal Time of observation. The observing interval was usually 4 minutes for D, and 3 minutes for I. Total intensity readings with the Varian were generally taken over an interval of 2 minutes immediately before the D observation and after the I observation. The mean time of the observing interval is shown for D and I and for F when readings were not taken before and after the angular measurements. The horizontal intensity (H) and vertical intensity (Z) values were computed from the observed F and I.

True azimuths used in the declination computations are based on solar observations by Peter J. Wasilewski and computed by solving the celestial triangle. The error in the true azimuth is believed to be less than 6 minutes of arc at most stations.

The observing accuracies of the instruments used for the magnetic observations are as follows:

Instrument	D	I	F	H
CARL Portable Magnetometer	±1'	±1'	----	-------
Varian M-49A	--	--	±10γ	-------
Transit Magnetometer	±1'	--	----	±0.001 H

REFERENCES

1. Magnetic Results, Ellsworth Highland Traverse and McMurdo-to-Pole Traverse, Antarctica, 1960-1961, H. Meyers and A. X. Meyer, U. S. Coast and Geodetic Survey. Inquiries regarding this report as well as information pertaining to magnetic observatory reports should be addressed to the Director, Coast and Geodetic Survey, Washington 25, D. C.

2. Total intensity was measured every 0.5 mile of the traverse using two Varian M-49A Magnetometers in a "modified leap-frog" method of travel. Information regarding these results may be obtained from the University of Wisconsin.

3. Addresses of other institutions participating in the traverse are:

U. S. Antarctic Research Program National Science Foundation Washington 25, D. C.	Institute of Polar Research Ohio State University Columbus, Ohio

Geophysical and Polar Research Center
University of Wisconsin
Madison, Wisconsin

4. Camp Minnesota, located near Eights Coast, is a temporary station which was established by the University of Minnesota during their geological study of the Jones Mountains in December of 1960. It was also the terminal station of the Ellsworth Highland Traverse in February 1961.

5. Sky-Hi Station was a temporary base of operation for various scientific disciplines during the 1961-1962 season. During the 1962-1963 season a more permanent installation, Eights Station, was established nearby. The position listed in this report is a preliminary position.

6. P. H. Serson and W. L. W. Hannaford, Canadian Journal of Technology, 34, 232-243 (1956).

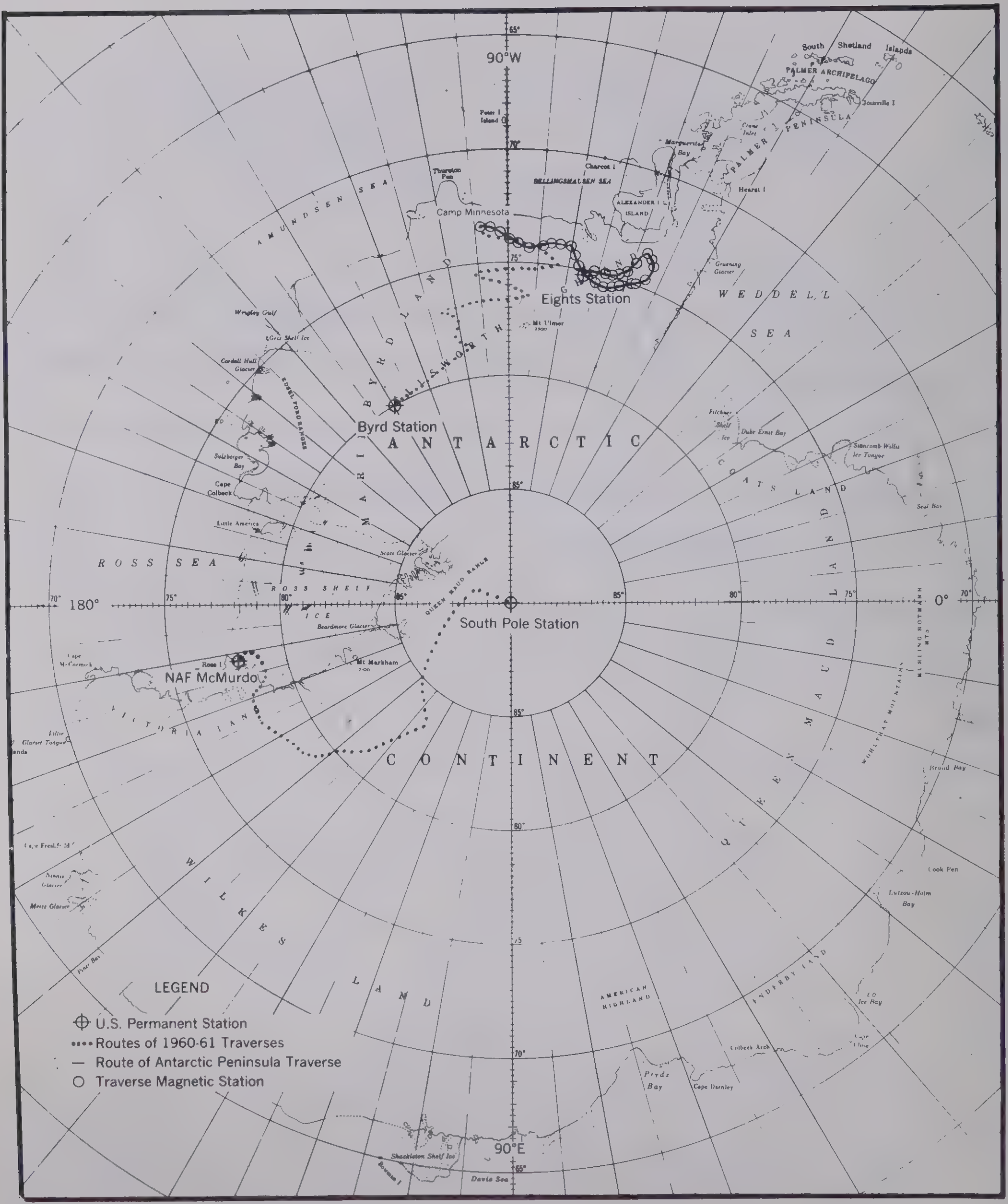

Fig. 1.--Route Traveled by the Expedition

Table 1. — Antarctic Peninsula Traverse Magnetic Observations

Station	Latitude	Longitude	Date	UT	D	UT	I	UT	F	H	Z
	° '	° '	1961	h m	° '	h m	° '	h m	γ	γ	γ
Old Byrd[a]	80 00.0 S	120 00 W	Oct. 21	22 45	68 57 E	23 04	74 34.3 S	----	-----	-----	-----
			22	00 28	69 03	00 38	74 35.4	----	-----	-----	-----
				00 45	69 02	00 50	74 35.3	----	-----	-----	-----
				01 02	69 06	01 14	74 35.8	----	-----	-----	-----
				03 03	69 16	03 08	74 36.6	----	-----	-----	-----
				03 27	69 19	03 33	74 36.8	----	-----	-----	-----
			23	01 15	69 12	01 22	74 39.0	*	60505	16017	-58346
				01 32	69 14	01 38	74 39.5	01 44	60505	16025	58349
				02 05	69 13	02 09	74 39.2	02 16	60493	16010	58336
				05 10	69 13	05 14	74 40.7	05 21	60495	15985	58345
				05 39	69 14	05 46	74 40.9	05 53	60500	15984	58351
				05 53	69 15	06 00	74 41.3	06 08	60500	15976	58353
			25	09 30	69 19	09 35	74 44.7	----	-----	-----	-----
				09 42	69 18	09 46	74 44.0	----	-----	-----	-----
				09 51	69 17	09 55	74 44.1	----	-----	-----	-----
			26	13 10	69 42	13 14	74 49.9	----	-----	-----	-----
				13 21	69 31	13 27	74 43.1	----	-----	-----	-----
				19 06	69 18	19 10	74 36.5	*	60508	16060	58338
				19 18	69 14	19 21	74 36.3	09 25	60513	16064	58342
				19 30	69 11	19 34	74 36.2	19 44	60516	16066	-58341
Camp Minn. (0)	73 29.0 S	94 25 W	Nov. 26	22 32	42 05	22 46	68 25.7	----	-----	-----	-----
				23 13	42 13	23 19	68 26.0	----	-----	-----	-----
			27	00 49	42 10	00 53	68 26.5	----	-----	-----	-----
				01 00	42 13	01 04	68 26.7	----	-----	-----	-----
				17 21	42 12	17 27	68 31.1	----	-----	-----	-----
				20 59	42 12	21 05	68 28.6	----	-----	-----	-----
				23 28	42 15	23 32	68 29.1	----	-----	-----	-----
				23 37	42 14	23 41	68 29.1	----	-----	-----	-----
			28	00 52	42 12	00 56	68 28.6	----	-----	-----	-----
				05 56	42 09	05 59	68 25.4	----	-----	-----	-----
				06 04	42 03 E	06 08	68 25.8 S	----	-----	-----	-----

[a] 150 feet NNW of absolute building of magnetic observatory.

* Total field measurements were made before D and after I.

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude	Longitude	Date	UT	D	UT	I	UT	F	H	Z
	° '	° '	1961	h m	° '	h m	° '	h m	γ	γ	γ
			Nov. 30	----	-----	----	-------	16 40	55280	-----	------
				----	-----	----	-------	17 55	55290	-----	------
				----	-----	----	-------	18 51	55285	-----	------
40	73 35.0 S	93 08 W	Dec. 1	10 29	42 07 E	10 36	68 14.3 S	10 40	54802	20318	-50896
				10 52	42 11	10 57	68 13.3	11 01	54802	20333	50891
				11 43	42 06	11 52	68 13.3	11 57	54830	20343	50917
				12 06	41 55	12 11	68 15.4	12 21	54820	20308	50920
				17 22	41 59	17 28	68 12.6	17 33	54957	20400	51030
				18 01	41 58	18 06	68 14.4	17 55	54952	20372	51036
				18 10	41 58	18 14	68 14.1	18 17	54972	20384	51053
80	73 48.0	91 25	2	11 39	41 31	11 45	68 16.2	*	54746	20169	50605
				12 16	41 29	12 27	68 15.1	*	54501	20194	50622
				----	-----	----	-------	20 03	54721	-----	-----
				20 21	39 55	20 27	68 00.4	20 16	54802	20523	50814
				----	-----	----	-------	20 57	54855	-----	-----
112	73 58.0	90 05	4	----	-----	01 19	67 44.2	01 08	54387	20605	50332
				----	-----	02 02	67 39.2	01 49	54302	20646	50224
				----	-----	04 18	67 51.6	04 26	54380	20494	50370
			7	02 28	40 03	02 33	67 42.3	*	54307	20603	50247
				03 32	40 03	03 35	67 42.0	*	54300	20604	50239
				04 27	40 05	04 31	67 41.1	04 44	54296	20616	50230
				11 08	40 15	11 13	67 47.1	*	54263	20516	50235
			8	06 00	40 09	06 04	67 41.7	*	54283	20603	50222
				10 16	39 58	10 20	67 44.0	*	54270	20564	50223
				12 32	40 00	12 38	67 45.8	*	54262	20534	50226
				13 22	40 03	13 28	67 46.2	*	54260	20528	50227
144	74 06.7 S	88 37 W	9	06 57	39 02	07 02	67 33.5	*	54147	20670	50046
				07 55	39 02 E	08 00	67 33.1 S	*	54141	20673	-50038

*Total field measurements were made before D and after I.

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude	Longitude	Date	UT	D	UT	I	UT	F	H	Z
	° '	° '	1961	h m	° '	h m	° '	h m	γ	γ	γ
192	74 15.0 S	86 21 W	Dec. 10	07 12	37 48 E	07 18	67 21.3 S	07 21	54758	21083	-50537
				09 04	37 46	09 12	67 22.0	09 18	54763	21074	50546
224	74 14.0	84 46	11	05 52	36 45	05 57	67 11.4	06 00	53532	20753	49346
				06 27	36 44	06 33	67 11.6	*	53527	20748	49342
				08 07	36 43	08 14	67 11.8	08 02	53493	20732	49312
				10 47	36 49	10 53	67 06.2	10 56	53473	20805	49260
				21 33	37 01	21 39	67 08.6	*	53606	20822	49397
				22 48	36 58	22 55	67 10.0	22 59	53582	20792	49383
				23 38	36 56	23 44	67 08.4	23 49	53590	20819	49381
			12	00 52	36 53	00 58	67 08.9	*	53596	20814	49389
				03 04	36 49	03 10	67 08.8	*	53577	20808	49371
				04 42	36 51	04 47	67 09.1	*	53561	20797	49358
256	74 13.0	83 15	13	01 15	35 23	01 19	67 00.7	01 25	53358	20838	49120
				02 03	35 23	02 09	67 00.2	----	-----	-----	-----
				----	----	04 29	67 03.1	04 34	53349	20801	49127
				----	----	05 18	67 03.7	----	-----	-----	-----
288	74 11.0	81 41	15	08 05	34 46	08 12	66 37.9	*	52902	20983	48562
				09 26	34 46	09 33	66 38.4	*	52897	20974	48561
				22 24	34 53	22 30	66 36.0 S	*	52963	21034	-48607
320	74 03.0 S	80 32 W	20	03 28	34 03[b]	----	------	03 36	52765	-----	-----
				----	----	----	------	04 11	-----	21125[b]	-----
				----	----	----	------	04 22	52763	-----	-----
				06 35	34 01[b]	----	------	06 42	52747	-----	-----
				----	----	----	------	06 56	-----	21013[b]	-----
				----	----	----	------	07 05	52745	-----	-----
				17 35	34 22 E[b]	----	------	17 46	-----	21058[b]	-----
				----	----	----	------	17 55	52727	-----	-----

[b] Observations with transit magnetometer.

* Total field measurements were made before D and after I.

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude ° '	Longitude ° '	Date 1961	UT h m	D ° '	UT h m	I ° '	UT h m	F γ	H γ	Z γ
352	74 22.0 S	79 25 W	Dec. 25	14 11	33 00 E	14 16	66 27.8 S	*	52581	20998	-48206
				15 22	32 57	15 27	66 25.6	*	52572	21025	48185
			26	00 32	32 55	00 37	66 21.8	*	52617	21096	48203
404	74 55.5	78 00	27	04 50	32 54[b]	----	------	04 41	52930	-----	-----
				----	----	----	------	05 04	-----	21111[b]	-----
				----	----	----	------	13 35	52895	-----	-----
				13 43	33 01[b]	----	------	14 02	-----	21073[b]	-----
Sky-Hi (433.5)	75 14.5	77 07	28	17 30	32 59[b]	----	------	17 36	53050	-----	-----
				----	----	----	------	17 51	-----	21067[b]	-----
				----	----	----	------	17 58	53048	-----	-----
				----	----	----	------	19 23	53080	-----	-----
				19 30	32 57[b]	----	------	19 43	-----	21189[b]	-----
				----	----	----	------	19 50	53060	-----	-----
			29	09 16	32 49	09 21	66 35.7	*	52996	21052	48635
			30	03 28	32 50	03 32	66 32.2	*	53022	21111	48638
				19 10	32 52	19 15	66 34.1	*	53000	21074	48630
				20 51	32 53	20 56	66 35.6	*	53019	21062	48656
			31	04 22	32 52	04 27	66 32.7	*	53008	21099	48628
				21 42	32 53	21 47	66 35.1	*	53005	21064	48640
			1962								
			Jan. 1	00 52	32 48	00 57	66 34.7	*	53020	21075	48651
464	74 56.5	76 01	5	01 30	-- 04†	01 35	66 17.1	*	52388	21070	47964
				02 32	-- 00†	02 38	66 16.2	*	52381	21080	47952
			6	02 03	-- 04†	02 08	66 16.4	*	52449	21104	48016
496	74 51.9 S	74 28 W	6	22 07	-- 00†	22 12	66 10.4	*	52162	21072	47716
			7	00 47	-- 02†	00 53	66 11.0	*	52166	21065	47724
				02 18	-- 01†	02 23	66 11.4	*	52160	21057	47721
				05 54	-- 02 E†	05 59	66 14.8 S	*	52141	21002	-47724

[b] Observations with transit magnetometer.

* Total field measurements were made before D and after I.

† Magnetic azimuth

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude ° '	Longitude ° '	Date 1962	UT h m	D ° '	UT h m	I ° '	UT h m	F γ	H γ	Z γ
528	74 59.2 S	73 23 W	Jan. 8	05 42	29 25 E	05 48	66 08.0 S	*	52679	21314	-48174
				07 40	29 24	07 47	66 07.7	*	52660	21311	48155
				08 38	29 24	08 42	66 07.8	*	52655	21307	48151
				15 57	29 22	16 03	66 08.4	*	52648	21296	48149
				18 44	29 30	18 49	66 07.7	*	52660	21311	48155
				21 27	29 30	21 31	66 07.4	*	52660	21315	48153
				22 47	29 34	22 51	66 07.1	*	52674	21325	48164
			9	03 57	29 23	04 02	66 06.7	*	52680	21333	48167
				05 58	29 24	06 02	66 07.7	*	52680	21319	48173
538.5	74 59.0	72 53	10	03 18	-- 06†	03 21	66 55.6	*	52057	20402	47892
				05 01	-- 00†	05 06	66 53.1	*	51997	20413	47823
572	74 50.2	71 43	11	04 40	-- 00†	04 45	65 54.9	*	51800	21139	47290
				06 29	-- 04†	06 32	65 54.8	*	51800	21141	47290
604	74 38.1	71 03	12	05 00	27 57	05 08	65 49.1	*	51660	21161	47127
				06 11	27 56	06 16	65 49.9	*	51665	21153	47136
				15 52	28 03	15 58	65 51.7	*	51650	21122	47134
				17 57	28 03	18 02	65 51.0	*	51660	21136	47139
				19 17	28 02	19 21	65 51.5	*	51672	21133	47153
				21 12	28 01	21 15	65 49.7	*	51672	21158	47141
				22 26	28 00	22 32	65 49.4	*	51679	21165	47146
			13	02 50	28 01	02 53	65 48.3	*	51680	21181	47140
636	74 16.2	70 10	13,14	23 59	27 30	00 05	65 35.3	*	51301	21202	46715
			14	02 52	27 34	02 56	65 35.4	*	51300	21200	46714
				05 09	27 27	05 12	65 34.2	*	51297	21215	46704
668	73 54.0 S	69 26 W	15	02 46	25 43	02 50	65 15.0	*	50970	21339	46288
				06 27	25 44	06 33	65 15.4	*	50959	21329	46280
				07 52	25 44 E	07 56	65 15.6 S	*	50955	21325	-46278

[*] Total field measurements were made before D and after I.

[†] Magnetic azimuth

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude	Longitude	Date	UT	D	UT	I	UT	F	H	Z
	° '	° '	1962	h m	° '	h m	° '	h m	γ	γ	γ
700	73 32.0 S	68 35 W	Jan. 16	02 56	-- 08 E†	03 01	64 50.6 S	03 05	50789	21590	-45972
				03 47	-- 08†	03 52	64 50.8	*	50790	21588	45974
				05 10	-- 07†	05 14	64 50.4	*	50789	21593	45970
				07 06	-- 00†	07 09	64 49.8	*	50740	21580	45922
				17 06	-- 15†	17 11	64 51.8	17 01	50759	21561	45952
				23 23	-- 10†	23 27	64 50.2	*	50805	21602	45984
732	73 43.0	67 16	18	06 37	-- 00†	06 41	64 38.2	*	50521	21641	45651
				13 45	-- 04†	13 49	64 40.0	*	50501	21608	45644
764	74 03.5	66 35	19	02 47	-- 01†	02 52	65 08.6	*	50642	21287	45950
				04 01	-- 00†	04 06	65 09.0	*	50649	21285	45959
796	74 27.2	67 08	20	01 17	24 40	01 21	65 07.3	*	50660	21312	45959
				02 26	24 39	02 30	65 05.6	*	50668	21338	45955
			25	14 03	24 36	14 08	65 07.5	*	50646	21304	45948
			27	01 21	24 41	01 25	65 05.9	*	50679	21339	45967
				03 50	24 40	03 54	65 05.9	*	50668	21334	45957
				06 42	24 33	06 47	65 07.3	*	50641	21304	45942
				12 31	24 40	12 34	65 08.2	*	50644	21294	45950
				23 30	24 40	23 33	65 05.6	*	50682	21344	45968
840	74 58.0	68 12	29	18 33	25 36	18 38	65 27.5	*	51560	21415	46902
				21 54	25 26	21 58	65 27.1	*	51565	21423	46904
864	75 00.3	68 50	31	02 43	26 39	02 47	65 33.5	*	51462	21293	46850
				04 26	26 39	04 29	65 33.9	*	51460	21287	46851
				13 07	26 35	13 12	65 37.5	*	51434	21227	46849
908	75 16.0 S	70 51 W	Feb. 1	16 28	27 54	16 32	66 29.3	*	51679	20617	47389
				18 24	27 57	18 27	66 28.2	*	51680	20632	47383
				21 14	27 52	21 17	66 19.0	*	51687	20762	47334
			2	03 57	27 46 E	03 59	66 19.1 S	*	51710	20769	-47356

---

[*] Total field measurements were made before D and after I.

[†] Magnetic azimuth

Table 1. — Antarctic Peninsula Traverse Magnetic Observations (con't)

Station	Latitude ° '	Longitude ° '	Date 1962	UT h m	D ° '	UT h m	I ° '	UT h m	F γ	H γ	Z γ
940	75 27.0 S	72 21 W	Feb. 3	01 10	29 19 E	01 13	66 10.9 S	*	52210	21084	-47763
				12 27	29 21	12 30	66 17.9	*	52181	20975	47780
976	75 33.0	73 37	4	12 31	-- 00†	12 36	66 35.3	*	52450	20840	48132
				13 22	-- 00†	13 26	66 35.4	*	52451	20839	48133
1008	75 14.5	77 07	5	00 01	33 13	00 04	66 07.0	*	52580	21289	48078
				02 51	33 15 E	02 54	66 07.9 S	*	52570	21272	-48074
Sky-Hi (1052.6)	75 14.5 S	77 07 W	6	----	----	----	------	04 13	53050	-----	-----

[*] Total field measurements were made before D and after I.

[†] Magnetic azimuth

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